

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (original): A cup attaching apparatus comprising:

attaching means having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

illuminating means for illuminating the lens and an index plate having an index of a predetermined pattern by means of rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said illuminating means;

imaging means for picking up the images projected onto said screen;

optical-center detecting means for obtaining a position of an optical center of the lens by processing the index image picked up by said imaging means; and

display means for displaying in a superposed manner information on the position of the optical center obtained by said optical-center detecting means and the lens image picked up by said imaging means,

wherein attachment of said cup to the lens is effected by alignment while observing display by said display means; and

wherein the cup attaching apparatus further comprises cylinder-axis detecting means for obtaining a direction of a cylinder axis of the lens by processing the index image picked up by said imaging means; and

wherein said display means also displays information on the direction of the cylinder axis obtained by said cylinder-axis detecting means.

2. (canceled).

3. (currently amended): The cup attaching apparatus according to claim 1, further comprising:

~~cylinder-axis detecting means for obtaining a direction of a cylinder axis of the lens by processing the index image picked up by said imaging means; and~~

input means for inputting data on an angle of an astigmatic axis obtained by prescription,

wherein said display means includes forming means for forming on the display a reference mark having a predetermined positional relationship with the reference axis at a relative position of the position of the optical center obtained by the optical-center detecting means, and an astigmatic axis mark indicating a direction of the astigmatic axis inputted by said input means, ~~said display means also displays information on the direction of the cylinder axis obtained by said cylinder-axis detecting means.~~

4. (original): The cup attaching apparatus according to claim 3, wherein said forming means forms on the display an optical center mark indicating the obtained position of the optical center, a cylinder axis mark indicating the obtained direction of the cylinder axis based on the optical center mark, and the astigmatic mark based on the reference mark or the optical center mark.

5. (currently amended): ~~The cup attaching apparatus according to claim 1,~~ A cup attaching apparatus comprising:

attaching means having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

illuminating means for illuminating the lens and an index plate having an index of a predetermined pattern by means of rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said illuminating means;

imaging means for picking up the images projected onto said screen;

optical-center detecting means for obtaining a position of an optical center of the lens by processing the index image picked up by said imaging means; and

display means for displaying in a superposed manner information on the position of the optical center obtained by said optical-center detecting means and the lens image picked up by said imaging means.

wherein attachment of said cup to the lens is effected by alignment while observing display by said display means; and

wherein said display means includes forming means for forming on the display a reference mark having a predetermined positional relationship with the reference axis at a relative position of the position of the optical center obtained by said optical-center detecting means.

6. (original): The cup attaching apparatus according to claim 5, further comprising:
selecting means for selecting a type of the lens,

wherein when a progressive multifocal lens is selected by said selecting means, said display means also displays an image of a layout mark of the progressive multifocal lens, and the alignment is effected while observing the image of the layout mark and the reference mark on the display.

7. (currently amended): ~~The cup attaching apparatus according to claim 1, further comprising:~~ A cup attaching apparatus comprising:

attaching means having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

illuminating means for illuminating the lens and an index plate having an index of a predetermined pattern by means of rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said illuminating means;

imaging means for picking up the images projected onto said screen;

optical-center detecting means for obtaining a position of an optical center of the lens by processing the index image picked up by said imaging means; and

display means for displaying in a superposed manner information on the position of the optical center obtained by said optical-center detecting means and the lens image picked up by said imaging means.

wherein attachment of said cup to the lens is effected by alignment while observing display by said display means; and

wherein the cup attaching apparatus further comprises input means for inputting data on a shape of an eyeglasses frame into which the lens is fitted and data on layout of the lens with respect to the eyeglasses frame,

wherein said display means includes forming means for forming on the display a frame shape figure based on the data inputted by said input means.

8. (original): The cup attaching apparatus according to claim 7, wherein said forming means forms the frame shape figure so that the reference axis or the obtained position of the optical center is aligned with a layout position of the optical center.

9. (original): The cup attaching apparatus according to claim 7, further comprising:

selecting means for selecting a type of the lens,

wherein said forming means further forms on the display a small lens portion mark for positioning a small lens portion of a bifocal lens on the basis of the data inputted by said input means when the bifocal lens is selected by said selecting means, alignment is effected while observing the small lens portion mark and an image of the small lens portion on the display.

10. (original): The cup attaching apparatus according to claim 7, further comprising:

storage means for storing a cup shape,

wherein said forming means forms, on the display based on the stored cup shape, a cup shape figure a center position of which has a predetermined positional relationship with the reference axis.

11. (original): The cup attaching apparatus according to claim 7, further comprising:

selecting means for selecting an optical center mode for attaching said cup at the position of the optical center of the lens and a frame center mode for attaching said cup at a position of a geometric center of the eyeglasses frame,

wherein said forming means further forms on the display a reference mark indicating a position of an optical center laid out by input by said input means,

when the optical center mode has been selected by said selecting means, said forming means forms the frame shape figure laid out with the reference axis and the reference mark aligned with each other, and when the frame center mode has been selected by said selecting

means, said forming means forms the frame shape figure laid out with the reference axis and the position of the geometric center of the eyeglasses frame aligned with each other.

12. (currently amended): The cup attaching apparatus according to claim 1, further comprising:

changing means for changing a position at which said screen is disposed on an a optical axis of projection.

13. (original): The cup attaching apparatus according to claim 1, wherein the index of the predetermined pattern includes an index by dots arranged in the form of a grid.

14. (currently amended): A cup attaching apparatus comprising:

attaching means having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

illuminating means for illuminating the lens and an index plate having an index of a predetermined pattern;

index detecting means for detecting an image of the index formed by said illuminating means;

optical-center detecting means for obtaining a position of an optical center of the lens with respect to the reference axis on the basis of a result of detection by said index detecting means; and

position storing means for storing information on the position of the optical center obtained by said optical-center detecting means when said cup is attached to the lens by said attaching means,

wherein the information on the position of the optical center stored by said ~~storage~~ position storing means is used as information on correction at the time of processing by an eyeglass lens processing apparatus.

15. (original): The cup attaching apparatus according to claim 14, wherein the index of the predetermined pattern includes dot indexes arranged grided.

16. (original): The cup attaching apparatus according to claim 14, further comprising:
shape storing means for storing a shape of the cup which is attached to the lens;
input means for inputting data on a shape of an eyeglasses frame into which the lens is fitted and data on layout of the lens with respect to the eyeglasses frame; and

display means for displaying alignment information for avoiding processing interference, on the basis of the cup shape stored by said shape storing means, the frame shape based on the data inputted by said input means, and a relative position of the optical center obtained by said optical-center detecting means with respect to the reference axis.

17. (original): The cup attaching apparatus according to claim 16, wherein said display means displays the cup shape in such a manner as to have a predetermined positional relationship

with the reference axis, and displays the frame shape such that a position of an optical center laid out by input by said input means is located at the position of the optical center obtained by said optical-center detecting means.

18. (original): The cup attaching apparatus according to claim 17, wherein said display means includes forming means for forming on display a reference mark for alignment having a predetermined positional relationship with the reference axis and a center mark indicating a position of the optical center or a position of a frame center of the frame shape.

19. (original): The cup attaching apparatus according to claim 16, wherein said display means displays a region for aligning the position of the optical center obtained by said optical-center detecting means with respect to the reference axis.

20. (original): The cup attaching apparatus according to claim 16, wherein said display means displays a region for aligning the position of the optical center obtained by said optical-center detecting means with respect to the reference axis, and includes forming means for forming on display a reference mark for alignment having a predetermined positional relationship with the reference axis and a center mark indicating a position of the optical center or a position of a frame center of the frame shape.

21. (original): The cup attaching apparatus according to claim 14, further comprising:

cylinder-axis detecting means for obtaining a direction of a cylinder axis of the lens on the basis of the result of detection by said index detecting means;

input means for inputting data on an angle of an astigmatic axis obtained by prescription;

displacement detecting means for obtaining information on displacement in the direction of the cylinder axis obtained by said cylinder-axis detecting means with respect to a direction of the astigmatic axis inputted by said input means; and

displacement storing means for storing the displacement information obtained by said displacement detecting means when the cup is attached to the lens by said attaching means,

wherein the displacement information stored by said displacement storing means is also used as information on correction at the time of processing by said eyeglass lens processing apparatus.

22. (original): The cup attaching apparatus according to claim 14, further comprising:

cylinder-axis detecting means for obtaining a direction of a cylinder axis of the lens on the basis of the result of detection by said index detecting means;

input means for inputting data on an angle of an astigmatic axis obtained by prescription;

and

display means for displaying information on the direction of the cylinder axis obtained by said cylinder-axis detecting means and information on a direction of the astigmatic axis inputted by said input means,

wherein alignment in the direction of the cylinder axis is effected while observing display by said display means.

23. (original): The cup attaching apparatus according to claim 14, further comprising:
a screen for projecting an image of the lens formed by said illuminating means;
imaging means for picking up an entire image of the lens projected onto said screen;
input means for inputting data on a shape of an eyeglasses frame into which the lens is fitted and data on layout of the lens with respect to the eyeglasses frame;
display means for displaying the lens image picked up by said imaging means; and
forming means for forming on display by said display means a frame shape figure based on the data inputted by said input means such that a position of an optical center laid out by input by said input means is located at the position of the optical center obtained by said optical-center detecting means.

24. (original): The cup attaching apparatus according to claim 14, further comprising:
a screen for projecting an image of the lens formed by said illuminating means;
imaging means for picking up an entire image of the lens projected onto said screen;
display means for displaying the lens image picked up by said imaging means;
forming means for forming on display by said display means a reference mark having a predetermined positional relationship with the reference axis; and
selecting means for selecting a type of the lens,

wherein when a progressive multifocal lens is selected by said selecting means, an image of a layout mark of the progressive multifocal lens is displayed on the display, and alignment is effected while observing the layout mark image and the reference mark on the display.

25. (original): The cup attaching apparatus according to claim 14, further comprising:
a screen for projecting an image of the lens formed by said illuminating means;
imaging means for picking up an entire image of the lens projected onto said screen;
display means for displaying the lens image picked up by said imaging means;
input means for inputting data on layout of the lens with respect to an eyeglasses frame;
selecting means for selecting a type of the lens; and

forming means for forming on display by said display means a small lens portion mark for positioning a small lens portion of a bifocal lens on the basis of the data inputted by said input means when the bifocal lens is selected by said selecting means,

wherein alignment is effected while observing the small lens portion mark and an image of the small lens portion on the display.

26. (currently amended): A cup attaching apparatus for attaching a cup onto an eyeglass lens, the cup being adapted to fix the eyeglass lens onto a lens rotating shaft of a lens processing apparatus, the cup attaching apparatus comprising:

cup attaching means for moving the cup to the lens placed at a predetermined position,
and attaching the cup onto the lens;

detecting means, provided with a measurement optical system having a measurement light source, a measurement index plate and a ~~an~~ photoelectric detector, for detecting a position of an optical center of the lens and a direction of a cylinder axis of the lens;

cylinder axis instructing means for instructing a direction of the cylinder axis of the lens;
and

display means for displaying a reference mark indicating a predetermined reference position, and an optical center mark and a cylinder axis mark both based on a result of detection by the detecting means, the optical center mark indicating the position of the optical center of the lens with respect to the predetermined reference position, the cylinder axis mark indicating the direction of the cylinder axis of the lens with respect to the instructed direction of the cylinder axis.

27. (original): The cup attaching apparatus according to claim 26, wherein the predetermined reference position includes a center position about which the cup is to be attached.

28. (original): The cup attaching apparatus according to claim 26, wherein the measurement index plate has an index by dots arranged in the form of a grid.

29. (original): The cup attaching apparatus according to claim 28, wherein the measurement optical system further includes a screen onto which an image of the index is

projected, and the photoelectric detector includes a two-dimensional image pick-up element for picking-up the image of the index projected onto the screen.

30. (original): The cup attaching apparatus according to claim 26, further comprising:
lens shape inputting means for inputting an outer circumferential shape of the lens,
wherein the display means displays the inputted outer circumferential shape of the lens
based on the optical center mark.

31. (original): The cup attaching apparatus according to claim 30, wherein the lens shape
inputting means includes image pick-up means for picking up an entire image of the lens placed
at the predetermined position, and the display means displays the picked-up image of the lens.

32. (original): The cup attaching apparatus according to claim 26, wherein the cylinder
axis instructing means includes axis angle inputting means for inputting an angle of an astigmatic
axis indicated by a prescription.

33. (original): The cup attaching apparatus according to claim 26, wherein the display
means displays the cylinder axis mark based on the optical center mark, and the display means
displays a second cylinder axis mark indicating the instructed direction of the cylinder axis of the
lens based on the reference mark or the optical center mark.

34. (original): The cup attaching apparatus according to claim 26, further comprising:
data input means for inputting data on a shape of an eyeglass frame to which the lens is to be fitted, and data on a layout of the lens with respect to the eyeglass frame,
wherein the display means displays a frame shape so that a center of the reference mark or a center of the optical center mark is aligned with a layout position of the optical center.

35. (original): The cup attaching apparatus according to claim 34, further comprising:
cup shape storing means for storing a cup shape,
wherein the display means further displays a cup shape figure centered with respect to the reference mark based on the stored cup shape.

36. (original): The cup attaching apparatus according to claim 26, further comprising:
judging means for judging at least one of whether the position of the optical center of the lens falls within a predetermined first range with respect to the predetermined reference position and whether the direction of the cylinder axis of the lens falls within a predetermined second range with respect to the instructed direction of the cylinder axis; and
notifying means for notifying a result of judgement by the judging means.

37. (original): The cup attaching apparatus according to claim 26, further comprising:
judging means for judging at least one of whether the position of the optical center of the lens falls within a predetermined first range with respect to the predetermined reference position

and whether the direction of the cylinder axis of the lens falls within a predetermined second range with respect to the instructed direction of the cylinder axis; and

control means for controlling operation of the cup attaching means based on a result of judgement by the judging means.

38. (original): The cup attaching apparatus according to claim 26, further comprising:
positional information storing means for storing an offset amount of the position of the optical center of the lens with respect to the predetermined reference position, and an offset amount of the direction of the cylinder axis of the lens with respect to the instructed direction of the cylinder axis; and

transmitting means for transmitting the stored offset amounts to the lens processing apparatus.

39. (new): The cup attaching apparatus according to claim 14, wherein
said optical-center detecting means obtains information on displacement of the position of the optical center with respect to the reference axis,
said position storing means stores the displacement information obtained by said optical-center detecting means when the cup is attached to the lens, and
the displacement information stored by said position storing means is used as the information on correction.

40. (new) A cup attaching apparatus comprising:

an attaching device having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

a light source that illuminates the lens and an index plate having an index of a predetermined pattern by rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said light source;

an imaging device that picks up the images projected onto said screen;

an optical-center detector that obtains a position of an optical center of the lens by processing the index image picked up by said imaging device; and

a display unit that displays in a superposed manner information on the position of the optical center obtained by said optical-center detector and the lens image picked up by said imaging device;

wherein attachment of said cup to the lens is effected by alignment while observing the display unit; and

wherein the cup attaching apparatus further comprises a cylinder-axis detector that obtains a direction of a cylinder axis of the lens by processing the index image picked up by said imaging device; and

wherein said display unit also displays information on the direction of the cylinder axis obtained by said cylinder-axis detector.

41. (new): A cup attaching apparatus comprising:

an attaching device having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

a light source that illuminates the lens and an index plate having an index of a predetermined pattern by rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said light source;

an imaging device that picks up the images projected onto said screen;

an optical-center detector that obtains a position of an optical center of the lens by processing the index image picked up by said imaging means; and

a display unit that displays in a superposed manner information on the position of the optical center obtained by said optical-center detector and the lens image picked up by said imaging device;

wherein attachment of said cup to the lens is effected by alignment while observing the display unit; and

wherein said display unit forms a reference mark having a predetermined positional relationship with the reference axis at a relative position of the position of the optical center obtained by said optical-center detector.

42. (new): A cup attaching apparatus comprising:

an attaching device having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

a light source that illuminates the lens and an index plate having an index of a predetermined pattern by rays of light shaped into a diameter larger than a diameter of the lens;

a screen for projecting an image of the lens and an image of the index which are formed by said light source;

an imaging device that picks up the images projected onto said screen;

an optical-center detector that obtains a position of an optical center of the lens by processing the index image picked up by said imaging means; and

a display unit that displays in a superposed manner information on the position of the optical center obtained by said optical-center detector and the lens image picked up by said imaging device;

wherein attachment of said cup to the lens is effected by alignment while observing the display unit; and

wherein the cup attaching apparatus further comprises an input device to input data on a shape of an eyeglasses frame into which the lens is fitted and data on layout of the lens with respect to the eyeglasses frame; and

wherein said display unit forms a frame shape figure based on the data inputted by said input device.

43. (new): A cup attaching apparatus comprising:

an attaching device having a reference axis to attach a cup as a processing jig to a subject lens along the reference axis;

a light source that illuminates the lens and an index plate having an index of a predetermined pattern;

an index detector that detects an image of the index formed by said light source;

an optical-center detector that obtains a position of an optical center of the lens with respect to the reference axis on the basis of a result of detection by said index detector; and

a position storage that stores information on the position of the optical center obtained by said optical-center detector when said cup is attached to the lens by said attaching device,

wherein the information on the position of the optical center stored by said position storage is used as information on correction at the time of processing by an eyeglass lens processing apparatus.

44. (new): A cup attaching apparatus for attaching a cup onto an eyeglass lens, the cup being adapted to fix the eyeglass lens onto a lens rotating shaft of a lens processing apparatus, the cup attaching apparatus comprising:

a cup attaching device that moves the cup to the lens placed at a predetermined position, and which attaches the cup onto the lens;

a detector, provided with a measurement optical system having a measurement light source, a measurement index plate and an photoelectric detector, that detects a position of an optical center of the lens and a direction of a cylinder axis of the lens;

a cylinder axis instructing device that instructs a direction of the cylinder axis of the lens;
and

a display that displays a reference mark indicating a predetermined reference position,
and an optical center mark and a cylinder axis mark both based on a result of detection by the
detector, the optical center mark indicating the position of the optical center of the lens with
respect to the predetermined reference position, the cylinder axis mark indicating the direction of
the cylinder axis of the lens with respect to the instructed direction of the cylinder axis.